

## **SUMMARY OF SANTA MARIA AND OSO FLACO NITRATE AND UNIONIZED AMMONIA TMDL REPORT**

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### **PROPOSED SCHEDULE**

- Draft Project Report: April 30, 2007
- Final Project Report: 2007
- Water Board Public Hearing: 2008

### **BACKGROUND**

#### **Listing Basis**

- Water bodies are identified on the 2002 Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments (the 303(d) list) or are proposed to be included on the 2006 303(d) list because nitrate and unionized ammonia levels exceeded municipal drinking water supply water quality objectives.
- Based on data collected by Central Coast Ambient Monitoring Program (CCAMP) staff.
- Water Board staff is further evaluating impacts to the more sensitive beneficial uses (e.g. aquatic life).

#### **Beneficial Uses**

- Municipal drinking water supply
- Aquatic life

### **DATA ANALYSIS AND CONCLUSIONS**

#### **Data Sources/Type**

Water Board staff relied on data collected by the following entities or programs:

- Central Coast Ambient Monitoring Program (CCAMP)
- City of Santa Maria Storm Water
- Orcutt-Solomon Creek storm event monitoring
- Oso Flaco Nitrate Study
- Cachuma Resource Conservation District Report
- Santa Maria Estuary Enhancement and Management Plan
- Case Study: Rangeland Management Measure Implementation Monitoring
- Wastewater Treatment Plant Monitoring
- Santa Maria Sanitary Landfill
- Maria Valley Groundwater Basin Data
- Department of Health Services Groundwater Data
- Santa Maria Basin Oil Field Assessment

- Santa Maria Oil Refinery
- Agricultural groundwater and field runoff monitoring
- Conditional Agricultural Waiver Program's Cooperative Monitoring Program

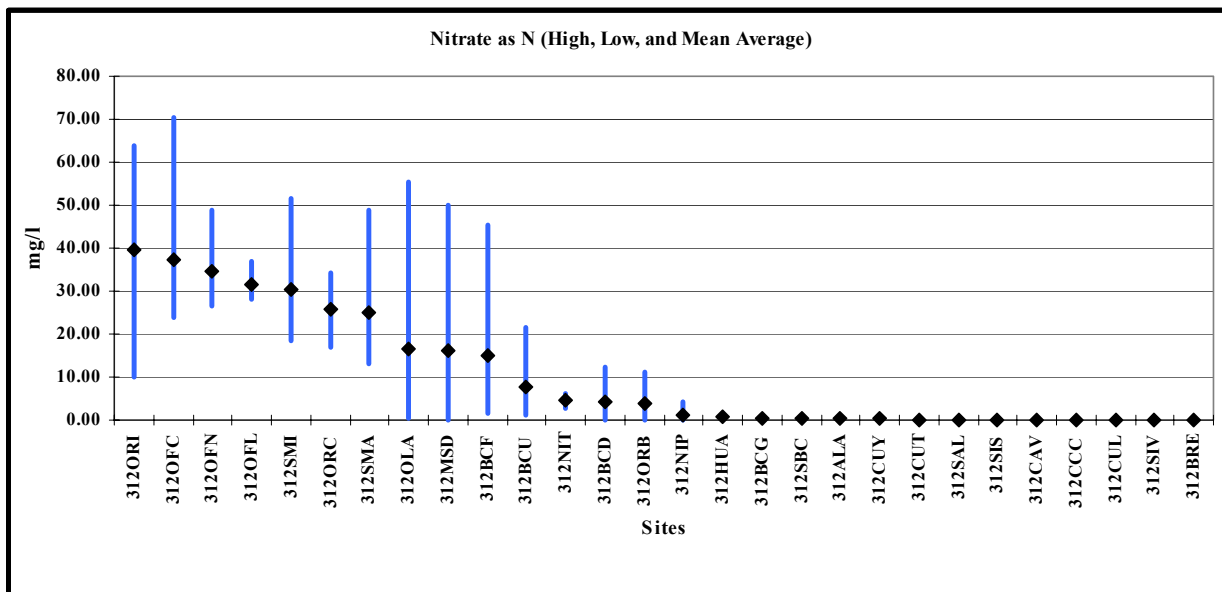


Figure 1. CCAMP Nitrate Concentrations in the Santa Maria And Oso Flaco Watersheds

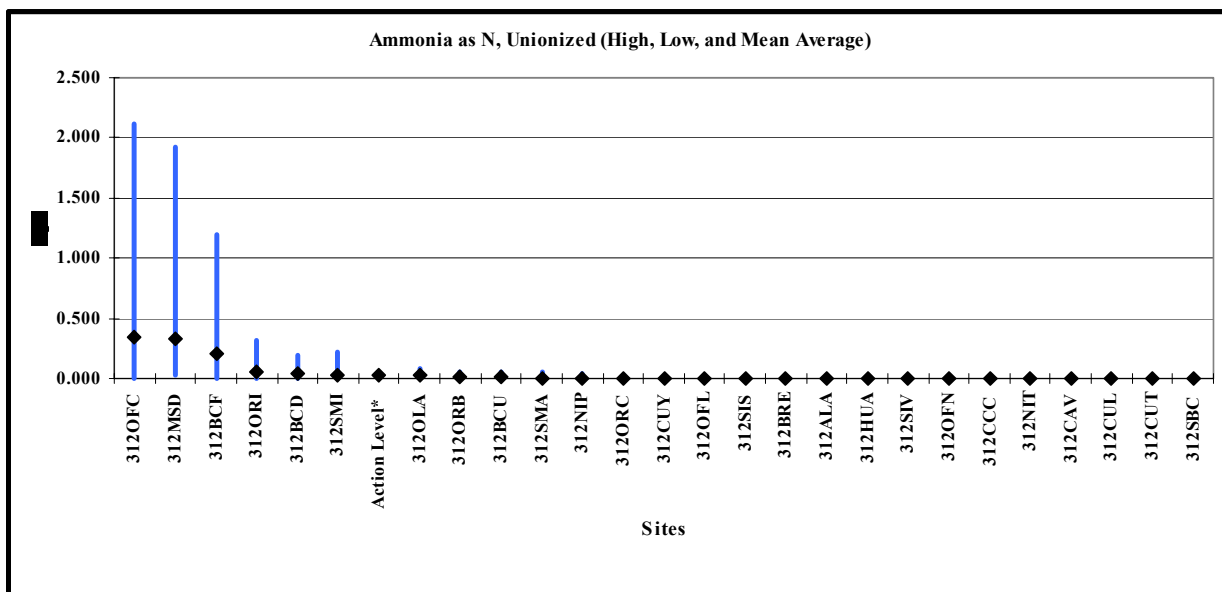


Figure 2. CCAMP Unionized Ammonia Concentrations in the Santa Maria And Oso Flaco Watersheds.

Figure 3. CCAMP monitoring locations in the upper Santa Maria watershed.

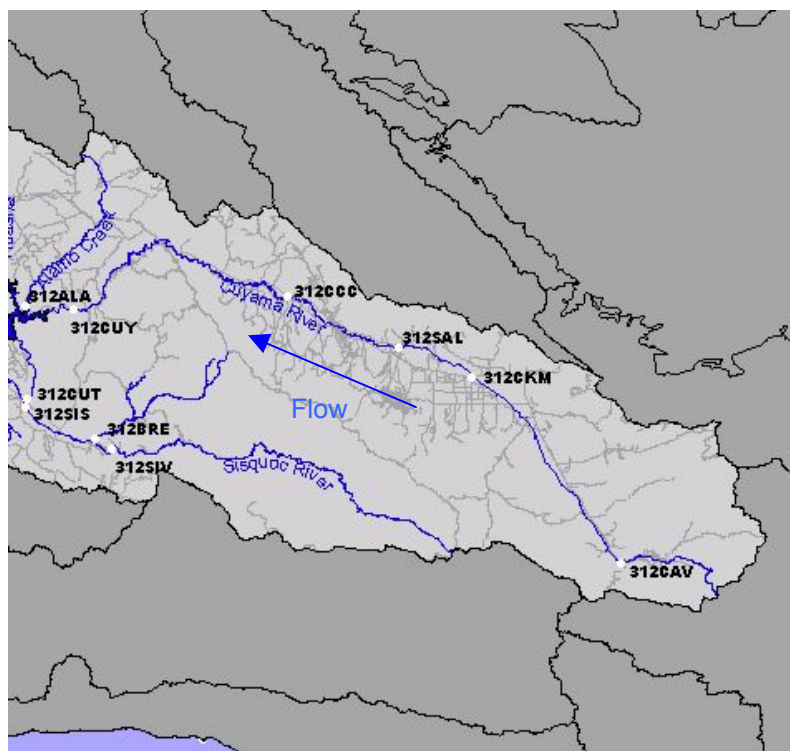
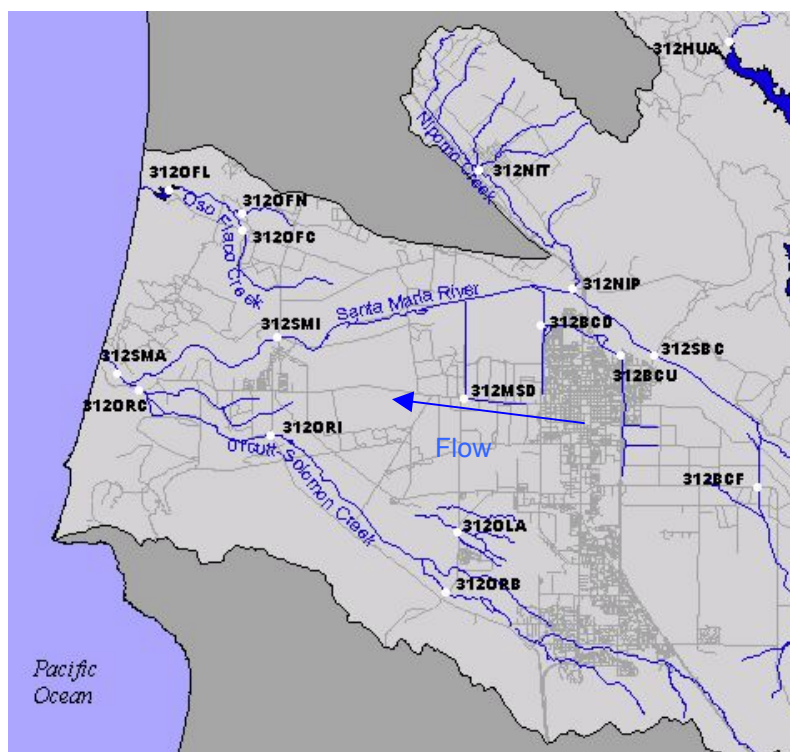


Figure 4. CCAMP monitoring locations in the lower Santa Maria watershed and Oso Flaco watershed.



## **Preliminary Conclusions:**

Water Board staff evaluated surface, groundwater, runoff, and effluent nitrate and ammonia data as part of numerous efforts to confirm impairment of the listed water bodies and further identify sources. Water Board staff also evaluated land use and flow information. Water Board staff concluded the following:

### ***Seasonality***

- The water bodies are characterized by extremely low flows and episodic high flows.
- Nitrate concentrations measured at the Main Street Canal, Orcutt-Solomon Creek, Oso Flaco Creek, and Little Oso Flaco Creek were elevated above water quality objectives year round.
- Nitrate concentrations along the Santa Maria River appeared to be higher during the dry season, although exceedances were found during every month of the year.
- Nitrate samples taken by the County of Santa Barbara (Project Clean Water) and by Komex Inc. from Orcutt-Solomon Creek and the Santa Maria River during storm events had concentrations less than the nitrate water quality objective.
- Unionized ammonia concentrations were elevated in the Santa Maria River upstream of the estuary, Bradley Canyon Creek, Blosser Channel, Main Street Canal, Orcutt-Solomon Creek, and Oso Flaco Creek above general water quality objectives year-round.

### ***Water Body Segment Impairments***

- Water bodies included or proposed for the 303(d) list were impaired, with a few exceptions described below.
- Water Board staff considers the most upstream site on Orcutt-Solomon Creek at Black Road (ORB), a low flowing drainage, as not impaired as it exhibited low nitrate and unionized ammonia levels year-round.
- Little Oso Flaco Creek is not specifically listed as impaired on the 303(d) list but was impaired for nitrate; Water Board staff will develop a nitrate TMDL for this water body.
- Oso Flaco Lake is on the 303(d) list, but is not designated as supporting the municipal use and as such, staff will not develop a nitrate TMDL for this water body unless numeric targets protective of aquatic life uses are warranted.
- Blosser Channel is not specifically listed as impaired on the 303(d) list but was impaired for unionized ammonia; Water Board staff will develop an unionized ammonia TMDL for this water body.

### ***Water Quality Data Analysis***

- Nitrate concentrations measured in storm water runoff from Prell and Hobbs Basins and the South Channel of Main Street did not exceed water quality objectives. Ammonia levels exceeded the objectives at Prell Basin and Main Street (North and South).
- In monthly samples taken between January 2000 and March 2001, nitrate concentrations in the Main Street Canal where it crosses under Main Street exceeded the water quality

objective in eight of fourteen samples. This site received runoff from both urban and agricultural areas.

- Data collected monthly by CCAMP showed that eleven of sixteen samples collected between January 2000 and March 2001 had higher nitrate concentrations at 312SMI than at 312SMA. According to the SMEEP, nitrate concentrations in the Santa Maria River at Highway 1 were lower than samples collected from the estuary. CCAMP staff determined that concentrations at 312ORC, upstream of Orcutt Creek's confluence with the Santa Maria River correlated strongly with the concentrations at the Estuary site (312SMA). Both efforts found that nitrate concentrations in the estuary were likely due to substantial nutrient input from Orcutt-Solomon Creek.
- Unionized ammonia levels were above the general water quality objective in the Santa Maria River, Bradley Canyon Creek, Blosser Channel, Main Street Canal, Orcutt-Solomon Creek, and Oso Flaco Creek.
- Urban storm water from the rural residential area of Nipomo Mesa to Oso Flaco watershed did not exceed nitrate water quality objectives; runoff did not occur during dry periods.
- Samples taken from Oso Flaco Creek and Little Oso Flaco Creek exceeded nitrate water quality objectives, but were typically less than samples from unnamed agricultural ditches.
- Irrigated agricultural discharges to agricultural drains and listed water bodies occur during both wet and dry seasons.
- Effluent and groundwater concentrations measured by the City of Santa Maria as part of their wastewater treatment plant permit were below water quality objectives.
- Groundwater concentrations measured by the City of Guadalupe were below the water quality objective, with the exception of levels measured upgradient of the wastewater spray field, which rose dramatically in 1998.
- Groundwater concentrations measured downgradient of the Laguna County Sanitation District were typically below 10 mg/l nitrate as N. All effluent samples were below 10 mg/L with the exception of one sample collected in April 2003. Surface water samples collected in Orcutt-Solomon Creek were higher downgradient of the wastewater treatment plant than upgradient.
- Groundwater nitrate concentrations measured by DHS on the Nipomo Mesa and within the Oso Flaco watershed were within water quality objectives.
- Groundwater nitrate concentrations at the Santa Maria Oil Refinery exceeded nitrate water quality objectives; the impacts from the Refinery to surface water in the Oso Flaco watershed are unknown and as such Water Board staff will further evaluate to determine if the Refinery is source of impairment.
- Groundwater nitrate concentrations in the Santa Maria Valley were elevated, with seven wells consistently exceeding the nitrate water quality objective.
- Groundwater samples from monitoring wells near Orcutt-Solomon Creek exceeded the nitrate water quality objective.
- Nitrate concentrations in storm water samples taken from the Santa Maria Sanitary Landfill were below 10 mg/L nitrate, with the exception of one sample taken in 2004.
- Nitrate concentrations in two groundwater samples from agricultural irrigation wells exceeded the water quality objective. Nitrate concentrations in the two agricultural lands field runoff samples varied in comparison to groundwater concentrations with higher concentrations than irrigated groundwater at one site and lower concentrations at the other.

## ***Land Use Analysis***

- The Santa Maria River, Orcutt-Solomon Creek, and Oso Flaco Creek watersheds received loading primarily from irrigated agricultural areas.
- Both agriculture and urban areas contributed nitrate loads to the Main Street Canal and Bradley Channel, and ammonia loads to Main Street Canal and Blosser Channel.
- Watersheds that were not impaired (e.g. Cuyama and Sisquoc) contained the largest open space (e.g. rangeland, shrub, forest) areas. Water Board staff considered the load from open space as non-controllable.
- Data indicated that rangeland areas did not contribute significant nitrate levels.
- Low density or rural residential land uses activities (manure from farm animals, failing individual septic systems) may have contributed to elevated nitrate and unionized ammonia levels, but the significance and origin of the sources were uncertain. As such, Water Board staff will further evaluate the significance of these activities as a source of impairment.

Groundwater nitrate concentrations in portions of the Santa Maria River watershed and other subwatersheds were substantially elevated, with numerous sites consistently exceeding the water quality objective. Irrigated agricultural growers often irrigate with groundwater that has elevated nitrate levels. Uncertainties were the origins (e.g. fertilizer, sewage) of the elevated nitrate levels throughout the project area. Furthermore, the impacts of the degraded groundwater to the listed water bodies were not fully understood.

## **PRELIMINARY SOURCES**

Water Board staff concluded that the following were sources:

- Irrigated agricultural runoff
- Urban runoff

Water Board staff was uncertain as to the significance of these activities to the impairment and will further evaluate and include a discussion in the Draft Project Report:

- Failing individual sewage disposal systems
- Farm animals/small livestock operations
- Santa Maria Refinery

Water Board staff concluded the following activities are not sources of nitrate:

- WWTPs and other facilities
- Santa Maria Sanitary Landfill
- Rangeland
- Open space

Water Board staff will further evaluate the significance of these activities to the ammonia impairment in the Santa Maria River watershed and characterize their contribution in the Draft Project Report.

## **NUMERIC TARGETS**

The proposed numeric targets for this project are consistent with the following water quality objectives:

- The municipal drinking water supply beneficial use is protected by the numeric water quality objective of 10 mg/l-N maximum for nitrate.
- The general water quality objective for toxicity includes a maximum concentration of 0.025 mg/L for unionized ammonia (NH<sub>3</sub>).

Water Board staff is further evaluating impacts to the more sensitive beneficial uses (e.g. toxicity to aquatic life) and will include numeric targets in the Draft Project Report for these beneficial uses if appropriate.

## **TOTAL MAXIMUM DAILY LOAD (TMDL)**

We propose that the TMDL be the same set of concentrations as the numeric targets.

## **ALLOCATIONS**

Water Board staff concluded at this time the following allocations are necessary to achieve water quality objectives:

- Load allocations of a maximum concentration of 10 mg/L for nitrate (as N) and a maximum concentration of 0.025 mg/L for unionized ammonia (NH<sub>3</sub>) to owners and operators of irrigated agriculture.
- Waste load allocations of a maximum concentration of 10 mg/L for nitrate (as N) and a maximum concentration of 0.025 mg/L for unionized ammonia (NH<sub>3</sub>) to municipalities for stormwater discharges.
- Recommend the allocations on the above table
- The Waste Load Allocations and Load Allocations for each non-natural (controllable) source are equal to the TMDL.
- Allocations are the same for each party because this is a concentration based TMDL
- The Allocations to background (uncontrollable) sources are also equal to the TMDL.
- Parties responsible for allocations to controllable sources are not responsible for allocations to background (uncontrollable) sources.

## **IMPLEMENTATION and MONITORING**

### **Implementation**

Implementation actions and monitoring requirements are likely to rely on existing and proposed regulatory mechanisms. Water Board staff recommends the following actions be developed or modified as part of TMDL implementation and/or development to address loading:

- ❑ Comply with existing Conditional Waiver by developing and implementing nutrient-control management practices for irrigated agricultural lands and participate in the Cooperative Monitoring Program;
- ❑ Review, approve, and enforce implementation of management measures in Storm Water Management Plans for the City of Santa Maria and the Counties of Santa Barbara and San Luis Obispo (Santa Barbara County plan approved);
- ❑ Implement Nonpoint Source (NPS) control programs for the City of Guadalupe to reduce storm water runoff and comply with the NPS Policy;
- ❑ Request that local (e.g. County, City, Community Services Districts, etc...) submit a proposal to establish "onsite wastewater management districts" to evaluate needs for upgrades, connections to sewer system, conduct inspections, monitoring and reporting;
- ❑ Implement NPS control implementation programs (e.g. photo-documenting management measures) for farm animal and livestock facilities on rural residential land uses, as part of WDRs, waivers, or prohibitions to comply with NPS Policy;
- ❑ Update wastewater treatment plant permits to include collection system management plans during permit renewal;
- ❑ Water Board staff request that the Santa Maria refinery monitor and report on groundwater conditions and discharges to determine if there are any impacts to the impaired water bodies in the Oso Flaco watershed; and
- ❑ Water Board staff will further evaluate the significance of several sources (e.g. from individual septic systems) of nitrate and ammonia to the water bodies.

### **Progress Review**

- Every three years, Water Board staff will evaluate implementation progress.

### **Additional Requirements**

- Additional requirements will be considered if implementation of management practices do not result in achievement of water quality objectives

### **Timeline**

- Water Board staff has not yet determined the timeframe that the TMDL should be achieved.

### **CONTACT INFORMATION:**

Katie McNeill

895 Aerovista Place, Suite 101, San Luis Obispo, CA 93401-7906.

(805) 549-3336

[kmcneill@waterboards.ca.gov](mailto:kmcneill@waterboards.ca.gov)